

LCR Bridge Measurements at Elevated Operating Levels *

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Abstract

A process to measure the resulting dielectric constant of full scale capacitors at 2.25 times the rated voltage is shown. Represented results of two basic ferroelectric ceramic materials are presented to illustrate this procedure. The selected materials are N4700 and Z5 type temperature coefficients. A critical part in the design of high voltage systems is the selection of the appropriate discrete components. Capacitors represent the work horse of most High-Voltage (HV) systems. High permittivity ferroelectric ceramics provide a family of high density capacitors. The resulting voltage effect on the value of a selected component is generally accepted. Using a remotely controlled LCR bridge, a HV-DC blocking capacitor, and a controlled environment standard components have been measured at voltage levels of 90 kV. The corresponding voltage rating of these units are 40 kV. Typical manufacture information of these components are provided in percent change of capacitance as a function of rated voltage. An alternate to this function is the relationship of dielectric constant to average field stress.

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